DOCUMENT RESUME

ED 309 941 SE 050 775

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TITLE Environmental Management, Hazard Management and Education.
PUB DATE 88
NOTE 12p.; Paper presented at the Hazard Management and the Environment Workshop (Australian Counter Disaster College, March 21-24, 1988).
PUB TYPE Speeches/Conference Papers (150) -- Information Analyses (070)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *College Science; *Conservation (Environment); *Curriculum Development; Environment; *Environmental Education; Foreign Countries; Hazardous Materials; Higher Education; Meetings; Natural Resources; Pollution; Science and Society; *Science Education; Science Instruction; Teaching Methods; *Workshops
IDENTIFIERS *Australia

ABSTRACT

This paper investigates the links between environmental management, hazard management, and education in Australia. The purpose of the paper is to show that hazards are a major aspect of the environment of all students, hazard education is fundamental to effective hazard management in a democratic society, and hazard education should be regarded as an essential part of the environmental education of all citizens. These conclusions are reached by considering the: (1) nature of the environment; (2) nature of environmental management; (3) goals of environmental education; (4) significance of hazards in the environment; (5) potential goals of a hazardous education curriculum; and (6) directions in which the Australian Counter Disaster College should be moving in pursuing the aims of its charter in the area of hazard education and environmental education. (MVL)

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Paper presented at the Hazard Management and the Environment Workshop at the Australian Counter Disaster College (March 21-24, 1988).

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ENVIRONMENTAL MANAGEMENT, HAZARD MANAGEMENT AND EDUCATION

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A paper presented to the Hazard Management and the Environment Workshop
at the Australian Counter Disaster College
March 21st - 24th 1988

In investigating the links between environmental management, hazard management and education in Australia, I intend to comment on the ways in which the environment, environmental management, and hazards are regarded by those who are concerned with education. The word "education" is used here not only to refer to the formal education system of schools, but also to informal education through the various youth organizations and to wider aspects of public education. My aim is to show that:

1) hazards are a major aspect of the environment of all students,
2) hazard education is fundamental to effective hazard management in a democratic society, and
3) hazard education should be regarded as an essential part of the environmental education of all citizens.

Accordingly, I shall consider:

1) the nature of our environment
2) the nature of environmental management
3) the goals of environmental education
4) the significance of hazards in our environment
5) the potential goals of a Haz-Ed curriculum
6) some directions in which ACDC should perhaps be moving in pursuing the aims of its charter in the area of Hazard Education and Environmental Education

1) The nature of our environment

Once, not so very long ago, we could use the word "environment" to refer merely to "nature", "surroundings" or "neighbourhood" (Fien, BASSP Bulletin 6, undated). Today, the term has become controversial, with a number of political overtones. Fien has pointed out that whereas we could at one time teach students about the beauty of rainforests or old colonial buildings to arouse pleasure and wonder, public perceptions have now changed so that while some people still revere the old and natural, others see conservation of such elements of Australia as inimical to progress and threatening to employment. The environment has become an "issue".

Despite this, many people still regard the term "environment" as referring primarily to "countryside" and therefore of marginal importance to the 86% of the Australian population who are urban dwellers. Such an attitude

denies the effects that human activities have had on the Australian landscape in the past and continue to have in the present. Weston (1986, cited in Fien, Bulletin 6) has stated that it is we, both individually and as a society "who shape our environment by deciding which social and economic priorities should prevail: we choose our environment rather than have it imposed on us by 'nature'." From this starting point, Fien goes on to state that:

> "As human goals and economic systems in Australia have changed over the centuries so too has the way nature has been perceived and used. The value systems, perceptions and actions of people have played a major role, along with natural processes, in creating the environment we know as Australia. However, in Australia, as in the rest of the world, history reveals a story of increasing human control and domination of nature as we push and push natural systems to the limits in order to satisfy all our needs and wants."

2. The nature of environmental management

The acceptance of the role of human activity in creating our environment implies that human beings have some choice about the environments in which they live. If human beings have some choice, then the further implication is that they may manage their environments accordingly. Such management involves decisions about policy; policies about the kinds of environment we require, and policies about how those environments are to be created or retained. In other words, there are two kinds of policies involved in environmental management: policies on intention and procedural policies.

Gregory (1985) in an article on the contribution of physical geography courses in tertiary institutions to environmental management and planning, puts forward the following definition:

> "Environmental management requires concern for the management of environment undertaken in such a way as to permit optimum use and resource production consistent with the minimum degradation of the environment by change or modification"

In the article Gregory makes a plea for such management to be placed more centrally in physical geography courses. He suggests three directions for work in physical geography at tertiary level:

1. progression towards a more pragmatic viewpoint for existing research;
2. greater emphasis on research with direct application to environmental management; and
3. the involvement of physical geographers in the process of environmental management.

Gregory is obviously concerned primarily with the procedures of managing the environment. This is borne out by his comment that environmental management cannot be left until the final year of a degree course, but that neither should they be introduced too early so that it is assumed that there is no remaining need to appreciate how the environment works.

Gregory is undoubtedly correct that high levels of understanding are required to design a flood mitigation scheme, protect a beach or evaluate land suitability for urban development, and that such decisions should be left to those who are skilled in such matters. However, the prior decisions about whether flood plains should be developed, which beaches should be protected and whether urban sprawl should be allowed to occur are matters of concern to all concerned citizens. To return to Weston, it is we "who shape our environment by deciding which social and economic priorities should prevail". In a democratic society, the prime responsibility for making policy must rest with the majority of the people, and few of them will undergo tertiary training in environmental management. These experts should be on tap, not on top.

3. Environmental education

In considering the goals of environmental education, Fien cites the Curriculum Development Centre sourcebooks for environmental education in Australian primary and secondary schools which claim that:

> "The goal of environmental education is to produce an environmentally literate citizen who will have the basic knowledge of and concern for the environment, awarenes of issues, basic skills to cope with issues and initiate solutions, as well as motivation and commitment to the measures of environmental management. (CDC 1981a & b)

To achieve this goal, attention must be paid to the three ways in which the environment may be approached in education:

> Education **in** the environment
> Education **about** the environment
> Education **for** the environment

Education in the environment enables students to encounter the reality in which their studies are based. Furthermore, it enables them to develop skills in data collection which range from observation, through experimental work and interviewing to map drawing, as well as the higher level skills of interpretation, analysis and synthesis.

Education about the environment includes studies which enable students to refine their understanding of the concepts which may be used to describe the environment in which we live. Fien has suggested that such concepts include:

ecosystem	energy flow
environmental change	consumerism
aesthetics	environmental ethics
interdependence	population
economics and technology	lifestyle
heritage	decision-making

Education for the environment requires that students be given the opportunity to use the concepts which they have attained and skills which they have developed to reach their own decisions about the environment. This may involve them in assessing the various values stances adopted by

different groups within our society, clarifying their own values position and deciding on the level of action on environmental matters which they feel is appropriate for them. In other words, to become **thinking, feeling and acting people.**
So far, it must be admitted, much environmental education has focussed on education **in** and education **about** the environment. Education **for** the environment has received only marginal attention in many schools. To remedy this situation, Fien suggests four areas to which attention may be directed:

1. Helping students to develop a sense of place and national identity from learning about and in the Australian environment.
2. Encouraging the development of a strong, enduring and sensitive environmental ethic;
3. Adopting an issues based approach to course developmentand teaching in order to promote an understanding of the political nature of all environmental decisions, the analysis and evaluation of the values which underlie alternative propositions and the development of decision making skills;
4. Providing opportunities for students to act on their attitudes and decisions through various types of social action and environmental improvement projects.

4. Hazards in our environment

In the context of the present workshop, the concern is with those parts of our environment which are, or may become, hazardous. In the same way that environment is often still taken to refer to the natural environment only, so hazards are often taken to refer just to those problems caused to human beings by nature. There is some justification for this. There are in the world an average of two earthquakes each day which are strong enough to damage buildings, at least fifty cyclones each year are large enough to cause considerable damage to human lives and constructions, and about ten percent of the world's five billion people live in coastal or river-side locations which periodically flood. However, just as our environment does not consist merely of "natural" features, but is largely a human construction, so hazards in the environment stem not just from natural events but also from our human creations.

Paterson (1984) has suggested a three fold classification of hazards on the basis of their primary cause.

1. The first class included the natural hazards such as cyclones, earthquakes, and volcanic eruptions, as well as all the other meteorological, geomorphic, floral and faunal hazards which affect us.

2. Hazards to and in our environment occur when human actions interact with natural processes. Such hazards include pollution and/or poisoning of the atmosphere or water and soil erosion, and may be either slow as in the case of the effects of chloroflurocarbons on the ozone layer, or rapid as in the case of Chernobyl, Three Mile Island, Bhopal, Seveso, the BLEVE in Cairns last year or the fire at the Brisbane chlorine plant of a few weeks ago.

3. Social hazards may be directly ascribed to intentional human activities such as terrorism, warfare, crime and drink driving.

Even this distinction between natural and human hazards does not fully reflect the links between human existence and the natural environment. The links between natural hazards and disasters and human beings have been considered in two contrasting ways.

Paterson has also explained how "natural hazards" are an integral part of the human-environment relationship. (Figure 1)

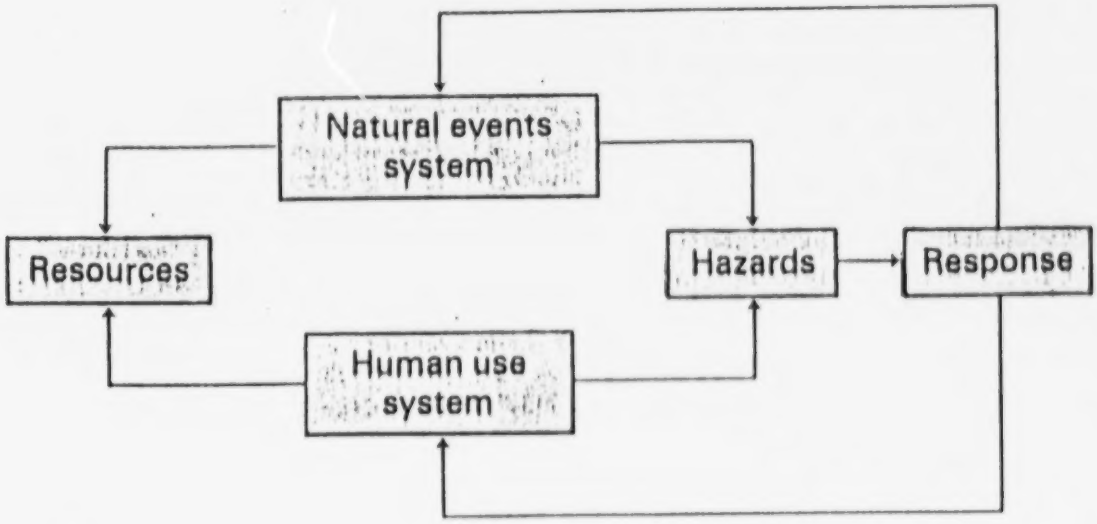

Figure 1. The two way association between human beings and their environment creates both resources and hazards (Paterson, 1985)

He considers that the interplay between natural and human systems produces both opportunities (resources) and constraints (hazards). These constraints limit the development of resources, but may also bestow benefits on human society. The potential costs are well known. Possible benefits can include fertile silt deposits after a flood and greater social and community cohesion, while no-one has as yet fully assessed the benefits to the Washington State Tourist Board of the 1980 eruption of Mt. St. Helens.

As long ago as 1974, White differentiated between extreme physical events, natural hazards and natural disasters. He commented that:

> "By definition, no natural hazard exists apart from human response to it. It always involves human initiative and choice. Floods would not be hazards were not people tempted to occupy flood plains. By their occupance they establish the damage potential, and may well change the flood regimen itself. Therefore, when earthquake, flood or tropical cyclone strikes one part of the earth it may or may not disrupt and damage the society in that area."

The venn diagram (Figure 2) shows the relationship between extreme natural events, natural hazards and natural disasters. Floods, earthquakes, volcanic eruptions and landslides are perfectly normal natural processes. They have the potential to become hazardous when they either occur where people live or have their property or when they exceed normal expectations of frequency or magnitude. The actual effects on the human population determine whether or not the event is regarded as a disaster.

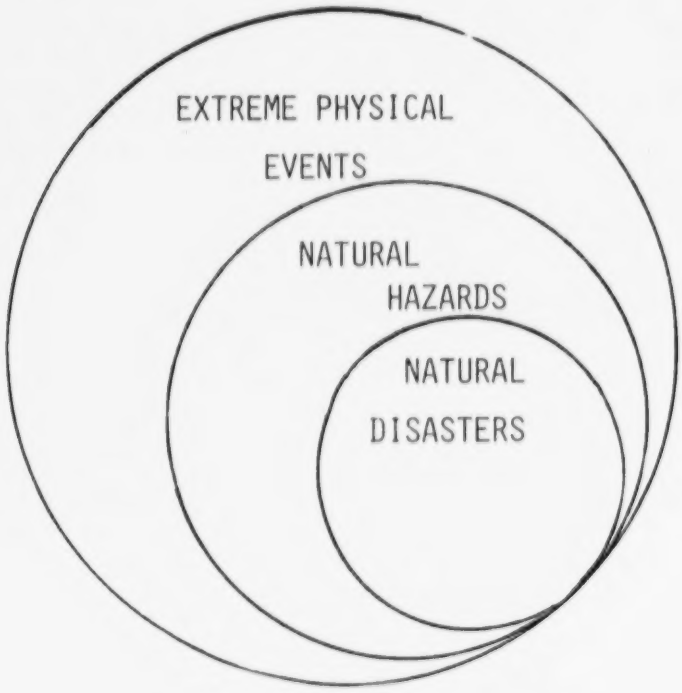

Figure 2. A venn diagram to illustrate the relationship between extreme physical events, natural hazards and natural disasters

It is axiomatic in the hazard management community that there is a (prevention,) preparedness phase, a response phase and a recovery phase to any disaster. Just as there appear to be two levels of decision making in environmental management as I suggested earlier, hazard management also appears to require two types of policy decision making. The technical aspects of alternatives in the preparation phase, the response to the onset of a specific disaster and technical aspects of the recovery phase may require specialized knowledge, but the more general policy aspects of the preparation phase and the recovery phase are, again, the responsibility of all citizens in a democratic society. Such citizens can, however, only fulfil their democratic responsibilities when they have knowledge of and concern for the safety of their communities.

5.Towards a Haz-Ed curriculum

I have argued at a previous workshop here at ACDC (Lidstone 1987) that hazard education should be regarded as part of education for good citizenship. Good citizenship was defined as consisting in morally correct activities. Insofar as hazardous events are a part of our total environment, both natural and of human origin, so Hazard Education may be considered as an essential part of environmental education. Thus I should like to suggest that the idea of environmental literacy be extended to include environmental morality. The words of the CDC sourcebooks may be adapted and paraphrased to provide goals for hazard education:

> "The goal of hazard education is to produce environmentally literate citizens who will have a basic knowledge of and concern for hazards in our environment, awareness of issues of hazard management, basic skills to cope with hazard management issues as well as a personal environmental morality and the motivation and commitment to contribute to the formulation of measures of hazard management appropriate to a democratic society."

Such an aim may have been behind the project initiated by Prof. Valussi at the University of Udine in Italy (Valussi, 1984).

Valussi and his team worked with students in an earthquake prone area of Italy. Valussi introduced his report by commenting that teachers in Italy frequently use natural disasters to promote a sense of human solidarity in their pupils, or to encourage sympathy and concrete help for victims. However, it had been observed in Italy that when disaster actually struck, the population was generally unprepared to cope and uninformed about the physical forces which produced the disaster. "No wonder then that they react fatalistically, or by protesting against the authorities, who are called upon to answer for the causes and the consequences of what happened." To raise public consciousness of the needs for appropriate preparation, response and recovery, the decision was made to introduce specific hazard education into school curricula. Valussi wrote that "since what is taught in school has indirect repercussions on the families of students, and today's students are tomorrow's adults, it is clear that the school in general and the teaching of geography in particular can play a very important role in the formation of ... consciousness throughout society."

The Udine University team carried out a survey of school students in Italy to discover their levels of understanding of the earthquake hazard. They found that:

* Most students were unable to distinguish between "pure natural hazards" and those in which human intervention has some responsibility.
* Of those students who had experienced a major earthquake (the majority) the strongest memories were of the visual-sensory or emotive type. In the zone which was nearest to the epicentre, an emotional indifference emerged while the greatest fear was found in the urban area away from the epicentre.
* A majority of students believed that earthquakes could be forecast while 42% also believed that they could be prevented. Only 7.5% denied the

possibility of preventing such disasters.
* There was great uncertainty amongst the students about whose responsibility it is to education the population about hazards.
* In schools, geography and natural sciences were seen as the obvious vehicles for such education.

Valussi concluded that students had a limited perception of the hazards which faced them, and he attributed this to the lack of specific educational action. However, there do not seem to have been any comparitive studies undertaken in areas in which other natural hazards threaten, or to discover students attitudes towards those hazards which are a part of normal urban life. Information collected by Drew Hutton in the BCAE Social Studies Department on the location of dangerous chemical dumps in Brisbane showed how widespread such stores are in residential areas. My own attitude to the risks from chemical stores changed considerably when I observed from Hutton's map that my own house is at risk from pollution in the event of a fire or explosion at one or another of a dozen different warehouses with winds from almost any direction. My concern as a citizen was aroused still further when I found out that fire officers are not allowed to enter premises to check on the storage conditions of dangerous chemicals but must rely on the goodwill of owners before they can make inspections (Courier Mail, 11.2.88). Friends and neighbours have expressed similar surprise when they have become aware of the pattern of asthma attacks in Brisbane. In one suburb 42% of young people have been shown to have signs of asthma (Courier Mail 24.2.88)

Despite the importance of such urban hazards to the urban environment of Australia, it appears that little has been done to make our students aware of their impact or to help them undertake their democratic rights and responsibilities. Internationally, what little work has been done in this area appears to have been limited to natural disasters.

Meneghel (1984) has worked on methods of promoting appropriate knowledge, skills and attitudes for students in the seismic areas of Italy. The objectives of this work include helping students:

* to realize the limitations of forecasting;
* to learn emergency measures
* to realize the potential for diminishing damage through advanced planning; and
* to develop a sense of civic solidarity;

Through simulation, students firstly investigate the role of the professional hazard management community, and then adopt the role of members of a hazard stricken community. Finally they move out of role to evaluate the reactions of each group.

In this way, students may be introduced to the nature of environmental management and hazard management from the viewpoints of professionals in this field. They may then explore the same issues from the point of view of the citizens who are affected both by the hazards themselves and the actions of the hazard management community, before reaching their own conclusions. The "civic solidarity" referred to by Meneghel may therefore be interpreted as including awareness of civic responsibility.

With hazard education placed firmly within the context of environmental education, the research and curriculum development project carried out in Italy my be related back to the three approaches to environmental education described above, and the needs of Australia.

The three elements of hazard education may be construed as follows:

1. Education **in** the environment in order that students may learn to identify potentially hazardous locations or situations. These may include developments on flood plains, too close to dune lines or of inappropriate siting or construction, as well as the siting of dangerous industrial plants near residential areas.

Education **about** hazards can make students conscious of the range of hazards which afflict the peoples of the world, their causes and potential consequences. Such studies also emphasise the ways in which disasters tend to discriminate between the "haves" and "have nots" in the world.
Education **for** hazard diminution whereby students may learn to participate in the preparation and recovery phases of disasters, and may also be encouraged to participate in the hazard management of their own environment as members of a democratic society.

Part of the Charter of the Australian Counter Disaster College states that the College is "to contribute to the development of an effective Australian counter-disaster capability ... by fostering understanding and co-operation between appropriate elements of the community". The Australian community is both part of, has created and is responsible for, the Australian environment. For this reason, education must be seen as a part of both environmental management and hazard management.

To this end, there are a number of areas which require urgent attention:

1. A master plan is needed to ensure logical and sequential hazard education within a context of environmental education throughout the country.
2. An effective rationale is needed for hazard education in formal, informal and community settings.
3. Research is needed on hazard perception and hazard education in the Australian context.
4. Existing learning experiences in Australian contexts need to be evaluated in terms of costs, benefits and effectiveness.
5. Within the formal education sector, exemplary learning materials and activities should be developed to support the school based curriculum development processes adopted by most states.
6. Workers in all areas of public education require appropriate educational experiences to enable them to fulfil their roles of ensuring an environmentally literate community.
7. An effective network/clearinghouse to ensure the effective dissemination of learning materials/activities is required.

A start has been made in meeting the needs outlined above through workshops arranged by ACDC in 1986 and 1987. I sincerely hope that the deliberations of this workshop will help to shed yet further light on the potential contribution of education to environmental management and hazard management in Australia.

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